



BSI Standards Publication

# **Date and time — Representations for information interchange**

---

Part 1: Basic rules



## National foreword

This British Standard is the UK implementation of [ISO 8601-1:2019](#). Together with [BS ISO 8601-2:2019](#), it supersedes [BS ISO 8601:2004](#), which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/47/-/3, eBusiness.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019  
Published by BSI Standards Limited 2019

ISBN 978 0 580 93758 3

ICS 01.140.30

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2019.

### Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

---

# INTERNATIONAL STANDARD

**ISO**  
**8601-1**

First edition  
2019-02-26

---

---

## **Date and time — Representations for information interchange —**

### **Part 1: Basic rules**

*Date et heure — Représentations pour l'échange d'information —  
Partie 1: Règles de base*



Reference number  
ISO 8601-1:2019(E)

© ISO 2019



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2019, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
[copyright@iso.org](mailto:copyright@iso.org)  
[www.iso.org](http://www.iso.org)



# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>Introduction</b>	<b>vii</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms, definitions and symbols</b>	<b>1</b>
3.1 Terms and definitions	1
3.1.1 Basic concepts	1
3.1.2 Time and date units	5
3.1.3 Representations and formats	8
3.2 Symbols	10
3.2.1 General	10
3.2.2 Time scale component symbols	10
3.2.3 Composite component symbols	11
3.2.4 Symbols used in place of digits or signs	11
3.2.5 Designator symbols	12
3.2.6 Separator symbols	13
<b>4 Fundamental principles</b>	<b>13</b>
4.1 Basic rules	13
4.2 Time scales	13
4.2.1 The Gregorian calendar	13
4.2.2 The week calendar	14
4.2.3 The 24-hour clock	15
4.3 Time scale components and units	15
4.3.1 General	15
4.3.2 Calendar year and years duration	15
4.3.3 Calendar month and months duration	15
4.3.4 Calendar week number and weeks duration	16
4.3.5 Calendar day of month and days duration	16
4.3.6 Calendar day of week	16
4.3.7 Calendar day of year	17
4.3.8 Clock hour and hours duration	17
4.3.9 Clock minute and minutes duration	17
4.3.10 Clock second and seconds duration	17
4.3.11 Decade	18
4.3.12 Century	18
4.3.13 Time shift	18
4.4 Expansion	18
4.5 Leading zeros	18
<b>5 Date and time representations</b>	<b>19</b>
5.1 General	19
5.2 Date	19
5.2.1 General	19
5.2.2 Calendar date	19
5.2.3 Ordinal date	20
5.2.4 Week date	21
5.3 Time of day	22
5.3.1 Local time of day	22
5.3.2 Beginning of the day	23
5.3.3 UTC of day	24
5.3.4 Local time scale and UTC	24
5.3.5 Omissions of time designator	25
5.4 Date and time of day	25

5.4.1	General.....	25
5.4.2	Complete representations .....	25
5.4.3	Representations other than complete.....	26
5.5	Time interval.....	27
5.5.1	Means of specifying time intervals.....	27
5.5.2	Duration.....	27
5.5.3	Complete representations .....	28
5.5.4	Representations other than complete.....	29
5.6	Recurring time interval.....	29
5.6.1	Means of specifying recurring time intervals .....	29
5.6.2	Separators and designators.....	30
5.6.3	Complete representations .....	30
5.6.4	Representations other than complete.....	30
<b>Annex A (informative) Example date and time expressions and representations .....</b>		<b>31</b>
<b>Bibliography .....</b>		<b>37</b>



## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 154, *Processes, data elements and documents in commerce, industry and administration*.

This first edition of [ISO 8601-1](#), together with [ISO 8601-2](#), cancels and replaces [ISO 8601:2004](#), which has been technically revised.

The main changes compared to [ISO 8601:2004](#) are as follows:

- conversion of the content as Part 1 with the Part title “Basic rules” due to the addition of another Part 2 “Extensions” of [ISO 8601](#);
- replacement of the term “midnight” with “beginning of day”, disallowing the value “24” for hour;
- update of terms and definitions:
  - “time point” is now “time”;
  - “local time” is now “local time of day”;
  - added definition for “time of day” and “local time scale”;
  - updated definitions for “standard time of day”, “local time of day” and “UTC of day” to rely on “time of day”;
  - combined two “day” terms in different domains for consistency;
  - change of the representation of “leap seconds”;
- clarification of “calendar day” expressions intended to mean “calendar day of week” (etc.);
- amendment of the recurring time interval ([3.1.1.11](#)) to provide a link to [ISO 8601-2:2019](#) which contains in Clause 5 the “repeat rules for recurring time intervals”.

A list of all parts in the [ISO 8601](#) series can be found on the ISO website.



Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).



## Introduction

The purpose of this document is to provide a standard set of date and time format representations for information interchange, in order to minimize the risk of misinterpretation, confusion and their consequences.

This document specifies a set of date and time format representations utilizing numbers, alphabets and symbols defined in [ISO/IEC 646](#). These representations are meant to be both human recognizable and machine readable.

This document retains the most commonly used expressions for date and time of day and their representations from earlier International Standards in the field, including earlier editions of [ISO 8601](#) and its predecessors.





# Date and time — Representations for information interchange —

## Part 1: Basic rules

### 1 Scope

This document specifies representations of dates of the Gregorian calendar and times based on the 24-hour clock, as well as composite elements of them, as character strings for use in information interchange. It is also applicable for representing times and time shifts based on Coordinated Universal Time (UTC).

This document excludes the representation of date elements from non-Gregorian calendars or times not from the 24-hour clock. This document does not address character encoding of representations specified in this document.

### 2 Normative references

There are no normative references in this document.

### 3 Terms, definitions and symbols

#### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

##### 3.1.1 Basic concepts

###### 3.1.1.1

###### date

*time* ([3.1.1.2](#)) on the *calendar* ([3.1.1.18](#)) *time scale* ([3.1.1.5](#))

Note 1 to entry: Common forms of date include *calendar date* ([3.1.2.7](#)), *ordinal date* ([3.1.2.8](#)) or *week date* ([3.1.2.9](#)).

###### 3.1.1.2

###### time

mark attributed to an *instant* ([3.1.1.3](#)) or a *time interval* ([3.1.1.6](#)) on a specified *time scale* ([3.1.1.5](#))

Note 1 to entry: The term “time” is often used in common language. However, it should only be used if the meaning is clearly visible from the context.

Note 2 to entry: On a time scale consisting of successive time intervals, such as a *clock* ([3.1.1.9](#)) or *calendar* ([3.1.1.18](#)), distinct instants may be expressed by the same time.

Note 3 to entry: This definition corresponds with the definition of the term “date” in [IEC 60050-113:2011](#), 113-01-12.



### 3.1.1.3

#### **instant**

point on the *time axis* ([3.1.1.4](#))

Note 1 to entry: An instantaneous event occurs at a specific instant.

[SOURCE: IEC 60050-113:2011, 113-01-08]

### 3.1.1.4

#### **time axis**

mathematical representation of the succession in time according to the space-time model of instantaneous events along a unique axis

Note 1 to entry: According to the theory of special relativity, the time axis depends on the choice of a spatial reference frame.

Note 2 to entry: In [IEC 60050-113:2011](#), 113-01-03, time according to the space-time model is defined to be the one-dimensional subspace of space-time, locally orthogonal to space.

[SOURCE: IEC 60050-113:2011, 113-01-07, modified — The words “according to the space-time” have been added; the phrase “special theory of relativity” has been changed to “theory of special relativity” for clarity; Note 2 to entry has been added.]

### 3.1.1.5

#### **time scale**

system of ordered marks which can be attributed to *instants* ([3.1.1.3](#)) on the *time axis* ([3.1.1.4](#)), one instant being chosen as the origin

Note 1 to entry: A time scale may amongst others be chosen as:

- continuous, e.g. international atomic time (TAI) (see IEC 60050-713:1998, 713-05-18);
- continuous with discontinuities, e.g. *UTC* ([3.1.1.12](#)) due to *leap seconds* ([3.1.1.24](#)), *standard time* ([3.1.1.14](#)) due to summer time and winter time;
- successive steps, e.g. *calendars* ([3.1.1.18](#)), where the *time axis* ([3.1.1.4](#)) is split up into a succession of consecutive *time intervals* ([3.1.1.6](#)) and the same mark is attributed to all instants of each time interval;
- discrete, e.g. in digital techniques.

[SOURCE: IEC 60050-113:2011, 113-01-11, modified — The words “amongst others” in Note 1 to entry have been added; NOTES 2 and 3 have been deleted.]

### 3.1.1.6

#### **time interval**

part of the *time axis* ([3.1.1.4](#)) limited by two *instants* ([3.1.1.3](#)) and, unless otherwise stated, the limiting instants themselves

[SOURCE: IEC 60050-113:2011, 113-01-10, modified — The words “and, unless otherwise stated, the limiting instants themselves” have been added; the NOTES have been deleted.]

### 3.1.1.7

#### **time scale unit**

unit of measurement of a *duration* ([3.1.1.8](#))

EXAMPLE 1 Calendar year, calendar month and calendar day are time scale units of the Gregorian calendar.

EXAMPLE 2 Clock hour, clock minutes and clock seconds are time scale units of the 24-hour clock.



### 3.1.1.8

#### duration

non-negative quantity of time equal to the difference between the final and initial *instants* (3.1.1.3) of a *time interval* (3.1.1.6)

Note 1 to entry: The duration is one of the base quantities in the International System of Quantities (ISQ) on which the International System of Units (SI) is based. The term “time” instead of “duration” is often used in this context and also for an infinitesimal duration.

Note 2 to entry: For the term “duration”, expressions such as “time” or “time interval” are often used, but the term “time” is not recommended in this sense and the term “time interval” is deprecated in this sense to avoid confusion with the concept of “time interval”.

Note 3 to entry: The exact duration of a *time scale unit* (3.1.1.7) depends on the *time scale* (3.1.1.5) used. For example, the durations of a year, month, week, day, hour or minute, may depend on when they occur [in a *Gregorian calendar* (3.1.1.19), a *calendar month* (3.1.2.19) can have a duration of 28, 29, 30, or 31 days; in a *24-hour clock* (3.1.1.10), a *clock minute* (3.1.2.4) can have a duration of 59, 60, or 61 seconds, etc.]. Therefore, the exact duration can only be evaluated if the exact duration of each is known.

Note 4 to entry: This definition is closely related to NOTE 1 of the terminological entry “duration” in [IEC 60050-113:2011](#), 113-01-13.

### 3.1.1.9

#### clock

*time scale* (3.1.1.5) suited for intra-day time measurements

EXAMPLE The *24-hour clock* (3.1.1.10) is a type of clock.

Note 1 to entry: *clock second* (3.1.2.2), *clock minute* (3.1.2.4) and *clock hour* (3.1.2.6) are often *time scale units* (3.1.1.7) included in a clock.

### 3.1.1.10

#### 24-hour clock

*clock* (3.1.1.9) that subdivides a *calendar day* (3.1.2.11) into 24 *clock hours* (3.1.2.6)

Note 1 to entry: *UTC* (3.1.1.12) forms the basis of today’s 24-hour clocks and is used in this document as a type of 24-hour clock, as described in 4.2.3.

### 3.1.1.11

#### recurring time interval

series of consecutive *time intervals* (3.1.1.6) of identical *duration* (3.1.1.8)

Note 1 to entry: If the duration of the time intervals is measured in *calendar* (3.1.1.18) entities, the duration of each time interval depends on the *calendar dates* (3.1.2.7) of its start and end.

Note 2 to entry: If the starting *instants* (3.1.1.3) of time intervals are repeated according to a set of rules, the “repeat rules for recurring time intervals” in [ISO 8601-2:2019](#), Clause 5 apply.

### 3.1.1.12

#### UTC

#### Coordinated Universal Time

*time scale* (3.1.1.5) with the same rate as International Atomic Time (TAI), but differing from TAI only by an integral number of *seconds* (3.1.2.1)

Note 1 to entry: UTC is the time standard commonly used across the world from which local time is derived.

Note 2 to entry: UTC is produced by the Bureau International des Poids et Mesures (BIPM), i.e. the International Bureau of Weights and Measures.

Note 3 to entry: TAI is a continuous time scale produced by the BIPM based on the best realizations of the SI second. TAI is a realization of Terrestrial Time (TT) with the same rate as that of TT, as defined by the International Astronomical Union Resolution B1.9 (2000).



[SOURCE: BIPM Recommendation CCTF 3 (2017), modified — The definition of TAI has been included as Note 3 to entry.]

#### 3.1.1.13

##### **UTC of day**

*time of day* (3.1.1.16) in *UTC* (3.1.1.12)

#### 3.1.1.14

##### **standard time**

*time scale* (3.1.1.5) derived from *UTC* (3.1.1.12), by a *time shift* (3.1.1.25) established in a given location by the competent authority

EXAMPLE 1 Some standard times do not vary within a year, such as US Eastern Standard Time (EST), US Eastern Daylight Time (EDT), Australia Western Standard Time (AWST), China Standard Time (CST), Hong Kong Standard Time (HKT), Korea Standard Time (KST) and Japanese Standard Time (JST).

EXAMPLE 2 Some standard times vary within a year, such as US Eastern Time (ET) and Australian Central Standard Time (ACST).

Note 1 to entry: The time shift of a standard time may vary in the course of a year, such as due to daylight savings.

[SOURCE: IEC 60050-113:2011, 113-01-17, modified — The original NOTE has been deleted; EXAMPLE 1 and 2 and Note 1 to entry has been added.]

#### 3.1.1.15

##### **local time scale**

locally-applicable *time scale* (3.1.1.5) such as *standard time* (3.1.1.14) or a non-*UTC* (3.1.1.12) based time scale

#### 3.1.1.16

##### **time of day**

*time* (3.1.1.2) occurring within a *calendar day* (3.1.2.11)

Note 1 to entry: Generally, time of day relates to the *duration* (3.1.1.8) elapsed after the beginning of the day. However, this correlation breaks when changes occur in the *time scale* (3.1.1.5) that applies to the time of day, such as *time shifts* (3.1.1.25) and *leap seconds* (3.1.1.24).

Note 2 to entry: This definition corresponds closely with the definition of “clock time” given in IEC 60050-113:2011, 113-01-18, except that the concepts of duration and time scale are not used in this definition.

#### 3.1.1.17

##### **local time of day**

*time of day* (3.1.1.16) in a *local time scale* (3.1.1.15)

#### 3.1.1.18

##### **calendar**

*time scale* (3.1.1.5) that uses the *time scale unit* (3.1.1.7) of *calendar day* (3.1.2.11) as its basic unit

EXAMPLE The *Gregorian calendar* (3.1.1.19) is a type of calendar.

Note 1 to entry: *calendar month* (3.1.2.19) and *calendar year* (3.1.2.21) are time scale units often included in a calendar.

#### 3.1.1.19

##### **Gregorian calendar**

*calendar* (3.1.1.18) in general use that defines a *calendar year* (3.1.2.21) that closely approximates the tropical year

Note 1 to entry: In this document the term “Gregorian calendar” is used to refer to the *time scale* (3.1.1.5) described in 4.2.1.



### 3.1.1.20

#### **common year**

*calendar year* (3.1.2.21) in the *Gregorian calendar* (3.1.1.19) that has 365 *calendar days* (3.1.2.11)

### 3.1.1.21

#### **leap year**

*calendar year* (3.1.2.21) in the *Gregorian calendar* (3.1.1.19) that has 366 *calendar days* (3.1.2.11)

Note 1 to entry: A leap year is a calendar year whose year number is divisible by four and is not a *centennial year* (3.1.1.22), or a centennial year whose year number is divisible by four hundred.

### 3.1.1.22

#### **centennial year**

*calendar year* (3.1.2.21) in the *Gregorian calendar* (3.1.1.19) whose year number is divisible without remainder by one hundred

### 3.1.1.23

#### **week calendar**

*calendar* (3.1.1.18) based on an unbounded series of contiguous *calendar weeks* (3.1.2.16) that uses the *time scale unit* (3.1.1.7) of calendar week as its basic unit to represent a *calendar year* (3.1.2.21), according to the rule that the first calendar week of a calendar year is the week including the first Thursday of that year, and that the last one is the week immediately preceding the first calendar week of the next calendar year

Note 1 to entry: This rule is based on the principle that a week belongs to the calendar year to which the majority of its *calendar days* (3.1.2.11) belong.

Note 2 to entry: In the week calendar, calendar days of the first and last calendar week of a calendar year may belong to the previous and the next calendar year respectively in the *Gregorian calendar* (3.1.1.19).

Note 3 to entry: The week calendar is described in 4.2.2.

### 3.1.1.24

#### **leap second**

intentional time step of one *second* (3.1.2.1) to adjust *UTC* (3.1.1.12) to ensure appropriate agreement with UT1, a *time scale* (3.1.1.5) based on the rotation of the Earth

Note 1 to entry: See also ITU-R TF.460-6.

Note 2 to entry: An inserted second is called a positive leap second and an omitted second is called a negative leap second. A positive leap second is inserted after [23:59:59Z] and can be represented as [23:59:60Z]. A negative leap second is achieved by the omission of [23:59:59Z]. Insertion or omission takes place as determined by the International Earth Rotation and Reference Systems Service (IERS), normally on 30 June or 31 December, but if necessary on 31 March or 30 September.

### 3.1.1.25

#### **time shift**

constant *duration* (3.1.1.8) difference between *times* (3.1.1.2) of two *time scales* (3.1.1.5)

## 3.1.2 Time and date units

### 3.1.2.1

#### **second**

base unit of *duration* (3.1.1.8) measurement in the International System of Units (SI)

Note 1 to entry: Second is as defined by the CGPM (Conférence générale des poids et mesures, General Conference on Weights and Measures) on the proposal of the CIPM (Comité international des poids et mesures, International Committee of Weights and Measures).

Note 2 to entry: See also ISO 80000-3.



### 3.1.2.2

#### **clock second**

*time scale unit* ([3.1.1.7](#)) whose *duration* ([3.1.1.8](#)) is one *second* ([3.1.2.1](#)).

Note 1 to entry: Clock second is in common parlance often referred to as second, however in this document clock second and second have different definitions.

### 3.1.2.3

#### **minute**

*duration* ([3.1.1.8](#)) of 60 *seconds* ([3.1.2.1](#))

Note 1 to entry: See also [ISO 80000-3](#).

Note 2 to entry: The duration of a minute is 60 seconds except if modified by the insertion or deletion of a *leap second* ([3.1.1.24](#)).

### 3.1.2.4

#### **clock minute**

*time scale unit* ([3.1.1.7](#)) whose *duration* ([3.1.1.8](#)) is one *minute* ([3.1.2.3](#))

Note 1 to entry: Clock minute is in common parlance often referred to as minute, however in this document clock minute and minute have different definitions.

### 3.1.2.5

#### **hour**

*duration* ([3.1.1.8](#)) of 60 *minutes* ([3.1.2.3](#))

Note 1 to entry: See also [ISO 80000-3](#).

### 3.1.2.6

#### **clock hour**

*time scale unit* ([3.1.1.7](#)) whose *duration* ([3.1.1.8](#)) is one *hour* ([3.1.2.5](#))

Note 1 to entry: Clock hour is in common parlance often referred to as hour, however in this document clock hour and hour have different definitions.

### 3.1.2.7

#### **calendar date**

particular *calendar day* ([3.1.2.11](#)) represented by its *calendar year* ([3.1.2.21](#)), its *calendar month* ([3.1.2.19](#)) and its *calendar day of month* ([3.1.2.13](#))

### 3.1.2.8

#### **ordinal date**

particular *calendar day* ([3.1.2.11](#)) represented by its *calendar year* ([3.1.2.21](#)) and its *calendar day of year* ([3.1.2.14](#))

### 3.1.2.9

#### **week date**

particular *calendar day* ([3.1.2.11](#)) represented by the *calendar year* ([3.1.2.21](#)) to which its *calendar week* ([3.1.2.16](#)) belongs, its *calendar week of year* ([3.1.2.17](#)) and its *calendar day of week* ([3.1.2.12](#))

### 3.1.2.10

#### **day**

*duration* ([3.1.1.8](#)) of a *calendar day* ([3.1.2.11](#))

Note 1 to entry: The term “day” applies also to the duration of any *time interval* ([3.1.1.6](#)) which starts at a certain time of day ([3.1.1.16](#)) on a certain calendar day and ends at the same time of day on the next calendar day.

Note 2 to entry: See also [ISO 80000-3](#).



### 3.1.2.11

#### **calendar day**

*time scale unit* (3.1.1.7) starting at the beginning of the day and ending with the beginning of the next day, the latter being the starting *instant* (3.1.1.3) of the next calendar day

Note 1 to entry: Calendar day is in common parlance often referred to as day, however in this document calendar day and day have different definitions.

Note 2 to entry: The *duration* (3.1.1.8) of a calendar day using the *24-hour clock* (3.1.1.10) is *24 hours* (3.1.2.5); except if modified by

- the insertion or deletion of *leap seconds* (3.1.1.24), by decision of the IERS, or
- the insertion or deletion of other time intervals, as may be prescribed by local authorities to alter the *time scale* (3.1.1.5) of local time.

### 3.1.2.12

#### **calendar day of week**

day amongst the sequence of *week calendar* (3.1.1.23) days, namely, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday or Sunday

Note 1 to entry: The week calendar is defined in 4.2.2.

### 3.1.2.13

#### **calendar day of month**

ordinal number of a *calendar day* (3.1.2.11) within a *calendar month* (3.1.2.19)

### 3.1.2.14

#### **calendar day of year**

ordinal number of a *calendar day* (3.1.2.11) within a *calendar year* (3.1.2.21)

### 3.1.2.15

#### **week**

*duration* (3.1.1.8) of a *calendar week* (3.1.2.16)

Note 1 to entry: The term “week” applies also to the duration of any *time interval* (3.1.1.6) which starts at a certain *time of day* (3.1.1.16) at a certain *calendar day* (3.1.2.11) and ends at the same time of day at the same calendar day of the next calendar week.

### 3.1.2.16

#### **calendar week**

*time scale unit* (3.1.1.7) of seven *calendar days* (3.1.2.11) which begins on Monday and ends on Sunday, according to the *week calendar* (3.1.1.23)

### 3.1.2.17

#### **calendar week of year**

ordinal number of a *calendar week* (3.1.2.16) within a *calendar year* (3.1.2.21) of the *week calendar* (3.1.1.23)

### 3.1.2.18

#### **month**

*duration* (3.1.1.8) of a *calendar month* (3.1.2.19)

Note 1 to entry: The term “month” applies also to the duration of any *time interval* (3.1.1.6) which starts at a certain *time of day* (3.1.1.16) at a certain *calendar day* (3.1.2.11) of the calendar month and ends at the same time of day at the same calendar day of the next calendar month, if it exists.

Note 2 to entry: In certain applications a month is considered as a duration of 30 calendar days.



### 3.1.2.19

#### **calendar month**

*time scale unit* (3.1.1.7) resulting from a defined division of a *calendar year* (3.1.2.21), each containing a specific number of *calendar days* (3.1.2.11)

Note 1 to entry: A calendar month is in common parlance often referred to as month, however in this document calendar month and month have different definitions.

### 3.1.2.20

#### **year**

*duration* (3.1.1.8) of a *calendar year* (3.1.2.21)

Note 1 to entry: In the *Gregorian calendar* (3.1.1.19), a year has 365 or 366 days. The duration is 366 days if the corresponding *time interval* (3.1.1.6) begins February 28 or earlier in a *leap year* (3.1.1.21) or March 2 or later in a year immediately preceding a leap year. If the interval begins February 29 (on a leap year), or March 1 of a year preceding a leap year, the end date has to be agreed on. Otherwise the duration is 365 days.

Note 2 to entry: The term “year” applies also to the duration of any *time interval* (3.1.1.6) which starts at a certain *time of day* (3.1.1.16) at a certain *calendar date* (3.1.2.7) of the calendar year and ends at the same time of day at the same calendar date of the next calendar year with the exception noted in Note 1 to entry.

### 3.1.2.21

#### **calendar year**

*time scale unit* (3.1.1.7) defined by the *calendar* (3.1.1.18) system

### 3.1.2.22

#### **decade**

*time scale unit* (3.1.1.7) of 10 *calendar years* (3.1.2.21), beginning with a year whose year number is divisible without remainder by ten

Note 1 to entry: Decade is also used to refer to an arbitrary *duration* (3.1.1.8) of 10 years, however decade is not used as such in this document.

### 3.1.2.23

#### **century**

*time scale unit* (3.1.1.7) of 100 *calendar years* (3.1.2.21) *duration* (3.1.1.8), beginning with a year whose year number is divisible without remainder by 100

EXAMPLE The 19th century covers the years 1800 through 1899.

Note 1 to entry: Century is also used to refer to an arbitrary duration of 100 years, however century is not used as such in this document.

## 3.1.3 Representations and formats

### 3.1.3.1

#### **date and time expression**

expression indicating a *time* (3.1.1.2), *time interval* (3.1.1.6) or *recurring time interval* (3.1.1.11)

EXAMPLE ‘2018-08-01’ is a date and time expression that indicates the first day of August of 2018 in the *Gregorian calendar* (3.1.1.19).

### 3.1.3.2

#### **date and time representation**

representation of the format of one or more *date and time expressions* (3.1.3.1)

EXAMPLE [date] is a date and time representation that can be expanded as [year][month][day], which itself can be expanded into [YYYY][MM][DD]; ‘20180801’ is a date and time expression that conforms to this representation.



### 3.1.3.3

#### **time scale component**

representation of a *time scale unit* ([3.1.1.7](#)) within a *date and time expression* ([3.1.3.1](#)) or *representation* ([3.1.3.2](#))

EXAMPLE 1 *calendar year* ([3.1.2.21](#)), *calendar month* ([3.1.2.19](#)), *calendar day* ([3.1.2.11](#)), *clock hour* ([3.1.2.6](#)), *clock minute* ([3.1.2.4](#)), *clock second* ([3.1.2.2](#)) are time scale components of a *complete representation* ([3.1.3.6](#)).

EXAMPLE 2 The calendar year time scale component is considered of a higher order than the calendar month time scale component, which is in turn of a higher order than the calendar day time scale component.

Note 1 to entry: A time scale component is considered of a higher order of another, if the time scale unit it represents has a strictly larger *time interval* ([3.1.1.6](#)) than that of another; the latter time scale component is therefore considered to be of a lower order.

Note 2 to entry: Common usage of this term often omits the leading phrase “time scale”, such as representing a “time scale component calendar year” by just “calendar year component”. This usage is deemed accepted in this document.

### 3.1.3.4

#### **basic format**

*date and time representation* ([3.1.3.2](#)) that does not include separators between its *time scale components* ([3.1.3.3](#))

### 3.1.3.5

#### **extended format**

extension of the *basic format* ([3.1.3.4](#)) that includes separators between its *time scale components* ([3.1.3.3](#))

### 3.1.3.6

#### **complete representation**

*date and time representation* ([3.1.3.2](#)) that includes all the *time scale components* ([3.1.3.3](#)) associated with the *expression* ([3.1.3.1](#))

### 3.1.3.7

#### **representation with reduced precision**

abbreviation of a *date and time representation* ([3.1.3.2](#)) by omission of lower order *time scale components* ([3.1.3.3](#))

### 3.1.3.8

#### **representation with decimal fraction**

expansion of a *date and time representation* ([3.1.3.2](#)) by addition of a decimal fraction to the lowest order *time scale component* ([3.1.3.3](#))

### 3.1.3.9

#### **decimal sign**

character used in a *representation with decimal fraction* ([3.1.3.8](#)) to separate the integer part from the decimal fraction of a number

Note 1 to entry: The representations of the decimal signs (period or comma) and their usage rules are specified in [ISO 80000-1](#).

### 3.1.3.10

#### **expanded representation**

expansion of a *date and time representation* ([3.1.3.2](#)) to allow identification of *calendar dates* ([3.1.2.7](#)) where the ordinal number identifying the *calendar year* ([3.1.2.21](#)) exceeds four digits



## 3.2 Symbols

### 3.2.1 General

Representations and expressions specified in this document make use of the symbols listed in [3.2.2](#) through [3.2.6](#).

Representations (also referred to as “format representations”) give rise to expressions for dates, times, intervals and recurring intervals.

EXAMPLE 1 [YYYY] is a format representation for a calendar year, where each Y is to be replaced by a single digit creating an expression, for example ‘1985’.

EXAMPLE 2 The date and time representation [YYYY][“-”][MM][“-”][DD] gives rise to the expression ‘2003-02-10’ which identifies 10 February 2003.

To clearly separate date and time representations from the text, punctuation marks and associated symbols used to describe them, the following symbols are used to demarcate boundaries of expressions and representations in this document:

- single quotation marks enclose expressions (for example ‘1985’); in some cases they are omitted to reflect the actualities of the examples; they are omitted in [Clause 5](#);
- all individual tokens that are part of a representation are contained between the open and close bracket symbols (“[” and “]”);

EXAMPLE 3 For the date and time representation [YYYY][“-”][MM][“-”][DD], [YYYY], [“-”], [MM], [“-”], and [DD] are individual tokens enclosed by brackets.

- when double quotations marks enclose a string within a representation, that string is literal and becomes part of any expression of that representation.

EXAMPLE 4 The representation [i][“Y”] represents a positive integer followed by the symbol “Y”. ‘12Y’ meaning “12 years” is an expression of that representation.

Quotation marks and brackets are not part of the expression or representation itself and shall be omitted in implementation.

All characters used in date and time expressions and representations are part of the [ISO/IEC 646](#) repertoire, except for “hyphen”, “minus” and “plus-minus”. In an environment where use is made of a character repertoire based on [ISO/IEC 646](#), “hyphen” and “minus” should be both mapped onto “hyphen-minus”.

The character “space” shall not be used in the expressions.

### 3.2.2 Time scale component symbols

The following time scale component symbols are in implied form, for the representation of date and time.

year	time scale component calendar year
month	time scale component calendar month
week	time scale component calendar week of year
day	time scale component calendar day of month
dayk	time scale component calendar day of week
dayo	time scale component calendar day of year



hour	time scale component clock hour
min	time scale component clock minute
sec	time scale component clock second
dec	time scale component decade
cent	time scale component century
$c(x,y)$	time scale component $c$ extended to accept a fixed-point number, with $x$ digits in the decimal part and $y$ digits in the fractional part; for example, [year(6,0)] represents a year time scale component that accepts 6 digits for year; [min(2,3)] represents a minute time scale component that accepts 2 digits in the decimal part and 3 digits in the fraction part, separated by a decimal sign

NOTE If  $y$  is omitted it is assumed to be zero. Thus [year(6)] means the same as [year(6,0)].

### 3.2.3 Composite component symbols

date	the composite time scale components for the complete representation of a date as determined in <a href="#">5.2.2.1 a)</a>
dateX	the composite time scale components for the complete representation of a date as determined in <a href="#">5.2.2.1 b)</a>
odate	the composite time scale components for the complete representation of an ordinal date of year as determined in <a href="#">5.2.3.1 a)</a>
odateX	the composite time scale components for the complete representation of an ordinal date of year as determined in <a href="#">5.2.3.1 b)</a>
wdate	the composite time scale components for the complete representation of a week date as determined in <a href="#">5.2.4.1 a)</a>
wdateX	the composite time scale components for the complete representation of a week date as determined in <a href="#">5.2.4.1 b)</a>
shift	the composite time scale component for time shift in basic form with hours and minutes, as determined in <a href="#">4.3.13 a)</a>
shiftH	the composite time scale component for time shift in basic hourly form, as determined in <a href="#">4.3.13 b)</a>
shiftX	the composite time scale component for time shift in extended form, as determined in <a href="#">4.3.13 c)</a>
time	the composite time scale components for the complete representation of a time of day as determined in <a href="#">5.3.1.2 a)</a>
timeX	the composite time scale components for the complete representation of a time of day as determined in <a href="#">5.3.1.2 b)</a>
duration	the composite time scale units for the representation of a duration as determined in <a href="#">5.5.2.2 a)</a> and <a href="#">b)</a>

### 3.2.4 Symbols used in place of digits or signs

These symbols are used to represent characters in the date and time representations. They are used in representations only, and are replaced by one or more characters, as described, in expressions:



Y	a digit used in the time scale component “calendar year”
M	a digit used in the time scale component “calendar month”
D	a digit used in the time scale component “calendar day”
E	a digit used in the time scale component “decade”
C	a digit used in the time scale component “century”
W	a digit used in the time scale component “calendar week”
h	a digit used in the time scale component “clock hour”
m	a digit used in the time scale component “clock minute”
s	a digit used in the time scale component “clock second”
n	a positive integer, may be left absent to signify an unbounded value
i	a positive integer
±	a plus sign [“+”] to represent a positive value or zero (the plus sign shall not be omitted), or a minus sign [“-”] otherwise

### 3.2.5 Designator symbols

These symbols are used to represent designators in the date and time expressions:

“H”	the hours designator, following a data element which represents the number of hours in a duration expression
“M”	the months or minutes designator, following a data element which represents the number of months or minutes in a duration expression  NOTE Although “M” can be used to designate months or minutes, its meaning is unambiguous in expressions because the time portion of a duration statement is preceded by the character “T”.
“P”	the duration designator, preceding the component which represents the duration  NOTE The use of the character “P” is based on the historical use of the term “period” for duration.
“R”	the recurring time interval designator
“S”	the seconds designator, following a data element which represents the number of seconds in a duration expression
“T”	the time designator, which indicates <ul style="list-style-type: none"><li>— the start of the representation of local time of day to designate local time of day expressions as such;</li><li>— the start of the representation of the time of day in date and time of day expressions;</li><li>— the start of the representation of the number of hours, minutes or seconds in expressions of duration</li></ul>
“Y”	the years designator, following a data element which represents the number of years in a duration expression



- “W” the week designator, following a data element which represents the ordinal number of a calendar week within the calendar year
- “Z” the UTC designator, added to the end of a time representation to indicate that a time of day is represented as UTC of day
- NOTE The use of character “Z” comes from its commonly known relationship with the “zero meridian”, and its usage in the military and navigation as “Zulu time” which was inherited from GMT (Greenwich Mean Time).
- “x” the representation of character “x” according to the textual representation of “x” in the [ISO/IEC 646](#) repertoire

### 3.2.6 Separator symbols

In date and time expressions and date and time representations, the following characters are used as separators.

- “-” (hyphen) the “-” hyphen character, in extended format, separates the time scale components for “year” and “month”, “year” and “week”, “year” and “day”, “month” and “day”, and “week” and “day”.
- “:” (colon) the “:” colon character, in extended format, separates the time scale components for “hour” and “minute”, and “minute” and “second”.
- “/” (solidus) the “/” solidus character separates start and end times in the representation of a time interval, as well as the symbol ‘R’ from the remainder of a recurring time interval representation.
- NOTE A solidus may be replaced with a double hyphen [“--”] by mutual agreement of the communicating partners.
- “.” (period), “,” (comma) the “.” period and “,” comma characters are decimal sign used to separate the integer part from the decimal fraction of a number.

## 4 Fundamental principles

### 4.1 Basic rules

This document gives a set of rules for the representation of

- dates and times,
- date and time intervals, and
- recurring intervals.

Both accurate and approximate representations can be identified by means of unique and unambiguous expressions specifying the relevant dates, times of day and durations. The degree of precision required and obtainable can be varied by including or deleting the appropriate time scale components (such as seconds).

The decreasing order of time scale components, left-to-right, is common to these representations.

### 4.2 Time scales

#### 4.2.1 The Gregorian calendar

This document uses the Gregorian calendar for the identification of calendar days.



The Gregorian calendar provides a time scale consisting of a series of contiguous calendar years, each identified by a year number represented by an integer, greater than that of the immediately preceding calendar year by 1. This document allows the identification of calendar years by their year number for years both before and after the introduction of the Gregorian calendar.

The Gregorian calendar distinguishes common years of 365 consecutive calendar days and leap years of 366 consecutive calendar days.

In the Gregorian calendar each calendar year is divided into 12 sequential calendar months, each consisting of a specific number of calendar days as indicated in [Table 1](#). Usage of the Gregorian calendar for identifying dates preceding its introduction (15 October 1582) should only be by mutual agreement of the communicating partners.

**Table 1 — Calendar months**

Calendar month number	Calendar month name	Number of days in the calendar month	Ordinal dates of calendar days in a common calendar year	Ordinal numbers of calendar days in a leap calendar year
01	January	31	001 to 031	001 to 031
02	February	28 (leap year 29)	032 to 059	032 to 060
03	March	31	060 to 090	061 to 091
04	April	30	091 to 120	092 to 121
05	May	31	121 to 151	122 to 152
06	June	30	152 to 181	153 to 182
07	July	31	182 to 212	183 to 213
08	August	31	213 to 243	214 to 244
09	September	30	244 to 273	245 to 274
10	October	31	274 to 304	275 to 305
11	November	30	305 to 334	306 to 335
12	December	31	335 to 365	336 to 366

#### 4.2.2 The week calendar

This document allows the use of the week calendar time scale for the identification of calendar days within a week.

This time scale is based on an unbounded series of contiguous calendar weeks. The calendar week number identifies the calendar week within the calendar year. Each calendar week has seven calendar days as indicated in [Table 2](#).

The reference point of the time scale assigns Saturday to 1 January 2000.

**Table 2 — Calendar days within a week**

Ordinal day number in the week	Name of day in the week
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday



Ordinal day number in the week	Name of day in the week
7	Sunday

NOTE When identifying a calendar day using a calendar year, a calendar week of year number and a calendar day of week, it is possible that the resulting calendar day belong to another calendar year in the Gregorian calendar. The week calendar as applied to the Gregorian calendar do not always match. For example, the first day of 2019 Week 1 (a Monday) is 2018-12-31.

### 4.2.3 The 24-hour clock

This document uses the 24-hour clock for identification of times within a calendar day, where the duration of a calendar day is defined as 24 clock hours, the duration of a clock hour as 60 clock minutes, and the duration of a clock minute generally as 60 clock seconds (except when insertion or omission of a leap second occurs).

Intra-day time scales provide marks which, except in case of discontinuities (e.g. daylight savings time), represent the duration elapsed after the start of the calendar day. These marks are referred to as time of day and are expressed in terms of the number of hours elapsed after the beginning of the day, the number of minutes elapsed after the last full hour, the integral number of seconds elapsed after the last full minute and, if applicable, the fractional part of the last full second. (Alternatively, the marks can be expressed in terms of the number of hours with fractional part of hour with no minute or second component, or hours and minutes with fractional part of minute, with no second component.)

## 4.3 Time scale components and units

### 4.3.1 General

Time scale units are represented in two forms within this document:

- a) implied form;
- b) explicit form.

In this document, time scale components for date and time are represented in implied form. Time scale units for duration (see 5.5.2) are represented in explicit form.

### 4.3.2 Calendar year and years duration

The Gregorian calendar defines a calendar year to be either 365 or 366 days, which begins on January 1 and ends on December 31. Each Gregorian calendar year can be identified by a 4-digit ordinal number beginning with '0000' for year zero, through '9999'.

The calendar year and years duration are represented as follows:

- a) Implied: [YYYY]  
EXAMPLE 1 '1985' (calendar year 1985)
- b) Explicit: [i]["Y"]  
EXAMPLE 2 '12Y' (twelve years)

The number of digits may exceed 4 in the case of expanded representation, in which case the year number may be preceded by a minus sign to indicate a year preceding year zero.

### 4.3.3 Calendar month and months duration

In the Gregorian calendar, each calendar month within its calendar year is identified by a specific name, and represented by a two-digit ordinal number from '01' for January to '12' for December.



The calendar month and months duration are represented as follows:

- a) Implied: [MM]  
EXAMPLE 1 '12' (calendar month December)
- b) Explicit: [i] ["M"]  
EXAMPLE 2 '8M' (8 months)

#### 4.3.4 Calendar week number and weeks duration

In the week calendar, the calendar week of year is identified by a two-digit ordinal number from '01' for the first calendar week through '52' or '53', depending on the number of calendar weeks in that calendar year.

The calendar week number and weeks duration are represented as follows:

- a) Implied: ["W"] [WW]  
EXAMPLE 1 'W03' (calendar week three)
- b) Explicit: [i] ["W"]  
EXAMPLE 2 '10W' (ten weeks)

#### 4.3.5 Calendar day of month and days duration

In the Gregorian calendar, the calendar day of month is represented by a two-digit ordinal number identifying the calendar day within a calendar month from '01', identifying the first calendar day of a calendar month, through '28', '29', '30' or '31' (depending on the month), identifying the last day of the month.

See [4.2.1](#) for the names of the months of the calendar year in the Gregorian calendar, listed in their order of occurrence, for their number of days, and for the ordinal dates of the days in common years and leap years.

The calendar day of month and days duration are represented as follows:

- a) Implied: [DD]  
EXAMPLE 1 '25' (25th day of the calendar month)
- b) Explicit: [i] ["D"]  
EXAMPLE 2 '25D' (25 days)

#### 4.3.6 Calendar day of week

In the week calendar, the calendar day of week is represented by a single digit ordinal number identifying a calendar day within a week, from '1', identifying Monday through '7', identifying Sunday.

The calendar day of week is represented as the following time scale component:

- a) Implied: [K]  
EXAMPLE '1' (calendar day of week Monday)
- b) Explicit: Not applicable



#### 4.3.7 Calendar day of year

In the Gregorian calendar, the calendar day of year is represented by a three-digit ordinal number identifying the calendar day within a calendar year, from '001', identifying January 1, through '365' (common year) or '366' (leap year), identifying December 31.

The calendar day of year is represented as the following time scale component:

- a) Implied: [000]  
EXAMPLE '350' (ordinal day 350 of the calendar year)
- b) Explicit: Not applicable

#### 4.3.8 Clock hour and hours duration

In the 24-hour clock, a clock hour is identified by a two-digit ordinal number from '00', identifying the first hour, through '23', identifying the last hour of a calendar day.

Clock hour and hours duration are represented as follows:

- a) Implied: [hh]  
EXAMPLE 1 '12' (12 clock hours past start of calendar day)
- b) Explicit: [i]["H"]  
EXAMPLE 2 '6H' (six hours)

#### 4.3.9 Clock minute and minutes duration

In the 24-hour clock, a clock minute is identified by a two-digit ordinal number from '00', identifying the first minute, to '59', identifying the last minute of a clock hour.

Clock minute and minutes duration are represented as follows:

- a) Implied: [mm]  
EXAMPLE 1 '30' (30 clock minutes past start of clock hour)
- b) Explicit: [i]["M"]  
EXAMPLE 2 '30M' (30 minutes)

#### 4.3.10 Clock second and seconds duration

In the 24-hour clock, a clock second is represented by a two-digit ordinal number from '00', identifying the first second, to '58', '59' or '60', identifying the last second of a clock minute ('58' with a negative leap second, '59' without a leap second, '60' with a leap second).

Clock second and seconds duration are represented as follows:

- a) Implied: [ss]  
EXAMPLE 1 '40' (40 clock seconds past start of clock minute)
- b) Explicit: [i]["S"]  
EXAMPLE 2 '30S' (30 seconds)



#### 4.3.11 Decade

The decade is represented as the following time scale component:

- a) Implied: [YYY]  
EXAMPLE '196' (the 1960s)
- b) Explicit: Not applicable

Decade shall be expressed only by mutual agreement of the communicating partners.

#### 4.3.12 Century

The century is represented as the following time scale component:

- a) Implied: [YY]  
EXAMPLE '19' (the 1900s)
- b) Explicit: Not applicable

#### 4.3.13 Time shift

A time shift, often used in the representation of local standard time against UTC, is represented as follows:

- a) Basic, hours and minutes: [±][hour][min] or ["Z"]  
EXAMPLE 1 '+0500' or 'Z'
- b) Basic, hours only: [±][hour] or ["Z"]  
EXAMPLE 2 '+05' or 'Z'
- c) Extended, hours and minutes: [±][hour][":"] [min] or ["Z"]  
EXAMPLE 3 '+05:00' or 'Z'

The UTC designator ["Z"] indicates that there is no time shift from UTC of day and is functionally equivalent to the expressions '+0000' and '+00:00'. The time shift shall be expressed as positive (i.e. with the leading plus sign ["+"]) if it is ahead of or equal to UTC, and as negative (i.e. with the leading minus sign ["-"]) if it is behind UTC.

### 4.4 Expansion

By mutual agreement of the communicating partners, it is permitted to expand the component identifying the calendar year, which is otherwise limited to four digits. This enables reference to dates where the calendar year identifier exceeds four digits.

### 4.5 Leading zeros

If a time scale component in an implied representation has a fixed length, leading zeros shall be used as required.

EXAMPLE The calendar month January is expressed as '01', not '1'.



## 5 Date and time representations

### 5.1 General

This clause provides date and time representations which describe date and time expressions.

Examples for date and time representations described in this clause and their expressions can be found in [Annex A](#).

### 5.2 Date

#### 5.2.1 General

For ease of comparison, in the following examples of representations of dates, the date of 12 April 1985 is used as an illustration, if applicable.

#### 5.2.2 Calendar date

##### 5.2.2.1 Complete representations

The complete representation of a calendar date shall be as follows.

- |    |                 |                              |
|----|-----------------|------------------------------|
| a) | Basic format    | [year][month][day]           |
|    | EXAMPLE 1       | 19850412                     |
| b) | Extended format | [year]["-"][month]["-"][day] |
|    | EXAMPLE 2       | 1985-04-12                   |

The representation defined in a) is referred to as [date] and that of b) as [dateX] as described in [3.2.3](#).

##### 5.2.2.2 Representations with reduced precision

If in a given application it is sufficient to express a calendar date with less precision than a complete representation as specified in [5.2.2.1](#), either two, four, five or six digits may be omitted, the omission starting from the rightmost digit. The resulting representation indicates a calendar month, a calendar year, a decade or a century, as set out below. When only [day] is omitted, a separator shall be inserted between [year] and [month], but separators are not used in the other reduced precision representations.

- |    |                           |                    |  |
|----|---------------------------|--------------------|--|
| a) | A specific calendar month |                    |  |
|    | Basic format:             | Not applicable     |  |
|    | Extended format:          | [year]["-"][month] | EXAMPLE 1      1985-04                       |
| b) | A specific calendar year  |                    |  |
|    | Basic format:             | [year]             | EXAMPLE 2      1985                          |
|    | Extended format:          | Not applicable     |  |
| c) | A specific decade         |                    |  |
|    | Basic format:             | [dec]              | EXAMPLE 3      198 (years 1980 through 1989) |
|    | Extended format:          | Not applicable     |  |



d) A specific century

Basic format:	[cent]	EXAMPLE 4	19 (years 1900 through 1999)
Extended format:	Not applicable		

### 5.2.2.3 Expanded representations

If, by agreement, expanded representations are used, the formats shall be as specified below. The interchange parties shall agree on the additional number of digits in the time scale component year. (Decade and century are automatically extended by the same number of digits.)

In the examples below it has been agreed to expand the time scale component year with two digits.

a) A specific calendar day

Basic format:	[±][year(6)][month][day]
EXAMPLE 1	+0019850412
Extended format:	[±][year(6)][“-”][month][“-”][day]
EXAMPLE 2	+001985-04-12

b) A specific calendar month

Basic format:	Not applicable
Extended format:	[±][year(6)][“-”][month]
EXAMPLE 3	+001985-04

c) A specific calendar year

Basic format:	[±][year(6)]
EXAMPLE 4	+001985
Extended format:	Not applicable

d) A specific decade

Basic format:	[±][dec(5)]
EXAMPLE 5	+00198
Extended format:	Not applicable

e) A specific century

Basic format:	[±][cent(4)]
EXAMPLE 6	+0019
Extended format:	Not applicable

### 5.2.3 Ordinal date

#### 5.2.3.1 Complete representations

A complete representation of an ordinal date shall be as follows.



- a) Basic format: [year][dayo]  
EXAMPLE 1 1985102
- b) Extended format: [year][“-”][dayo]  
EXAMPLE 2 1985-102

### 5.2.3.2 Expanded representations

If by agreement, expanded representations are used, the formats shall be as specified below. The interchange parties shall agree on the additional number of digits in the time scale component year.

In the examples below it has been agreed to expand the time scale component year with two digits.

- a) Basic format: [±][year(6)][dayo]  
EXAMPLE 1 +001985102
- b) Extended format: [±][year(6)][“-”][dayo]  
EXAMPLE 2 +001985-102

## 5.2.4 Week date

### 5.2.4.1 Complete representations

A complete representation of a week date shall be as follows.

- a) Basic format: [year][“W”][week][dayk]  
EXAMPLE 1 1985W155
- b) Extended format: [year][“-”][“W”][week][“-”][dayk]  
EXAMPLE 2 1985-W15-5

### 5.2.4.2 Representations with reduced precision

The time scale component calendar day of week may be omitted from the representation in [5.2.4.1](#).

- a) Basic format: [year][“W”][week]  
EXAMPLE 1 1985W15
- b) Extended format: [year][“-”][“W”][week]  
EXAMPLE 2 1985-W15

### 5.2.4.3 Expanded representations

If by agreement, expanded representations are used, the formats shall be as specified below. The interchange parties shall agree on the additional number of digits in the time scale component year.

In the examples below it has been agreed to expand the time scale component year with two digits.

- a) A specific day



Basic format:	[±][year(6)][“W”][week][dayk]
EXAMPLE 1	+001985W155
Extended format:	[±][year(6)][“-”][“W”][week][“-”][dayk]
EXAMPLE 2	+001985-W15-5

b) A specific week

Basic format:	[±][year(6)][“W”][week]
EXAMPLE 3	+001985W15
Extended format:	[±][year(6)][“-”][“W”][week]
EXAMPLE 4	+001985-W15

## 5.3 Time of day

### 5.3.1 Local time of day

#### 5.3.1.1 General

Representations of local time of day as defined below make no provisions to prevent ambiguities in expressions that result from discontinuities in the local time scale (e.g. daylight-saving time). When the need arises to prevent these ambiguities, the representations provided in [5.3.4.2](#) may be useful.

NOTE In accordance with [5.3.5](#), some of the examples for extended formats below have the prefixed time designator [“T”] omitted.

#### 5.3.1.2 Complete representations

A complete representation of local time of day shall be as follows.

a) Basic format:	[“T”][hour][min][sec]
EXAMPLE 1	T232050
b) Extended format:	[“T”][hour][“:”][min][“:”][sec]
EXAMPLE 2	T23:20:50

#### 5.3.1.3 Representations with reduced precision

The time scale component second, or the time scale components of both second and minute, may be omitted from the representation in [5.3.1.2](#).

a) A specific hour and minute

Basic format:	[“T”][hour][min]
EXAMPLE 1	T2320
Extended format:	[hour][“:”][min]
EXAMPLE 2	23:20

b) A specific hour



Basic format:	["T"][hour]
EXAMPLE 3	T23
Extended format:	Not applicable

#### 5.3.1.4 Representations with decimal fraction

A decimal fraction of hour, minute or second may be included in a representation. If included, lower order time scale components (if any) shall be omitted and the decimal fraction shall be divided from the integer part by the decimal sign. If the magnitude of the number is less than one, the decimal sign shall be preceded by two zeros.

The interchange parties shall agree upon the maximum number of digits in the decimal fraction, indicated below as "y" (in the examples below, y=1). The format shall be [hhmmss,s], [hhmm,m] or [hh,h] as appropriate (hour minute second, hour minute and hour, respectively). A decimal fraction shall have at least one digit.

- a) A specific hour, minute and second and a decimal fraction of the second

Basic format:	["T"][hour][min][sec(2,y)]
EXAMPLE 1	T232030,5
Extended format:	[hour][":"][min][":"][sec(2,y)]
EXAMPLE 2	23:20:30.5

- b) A specific hour and minute and a decimal fraction of the minute

Basic format:	["T"][hour][min(2,y)]
EXAMPLE 3	T2320,8
Extended format:	[hour][":"][min(2,y)]
EXAMPLE 4	23:20,8

- c) A specific hour and a decimal fraction of the hour

Basic format:	["T"][hour(2, y)]
EXAMPLE 5	T23.3
Extended format:	Not applicable

#### 5.3.2 Beginning of the day

The complete representations in basic and extended format for the beginning of the day, in accordance with [5.3.1](#), are as follows:

- a) Basic format: T000000 (in the format of [5.3.1.2 a\)](#))
- b) Extended format: 00:00:00 or T00:00:00 (in the format of [5.3.1.2 b\)](#))

NOTE "T" is always present in basic format. For extended format, "T" can be omitted for a time-only expression but is included for a date-and-time expression.



The representations may have reduced precision in accordance with 5.3.1.3 or may omit the time designator in accordance with 5.3.5. To represent the beginning of the day the representations may be expanded with a decimal fraction containing only zeros in accordance with 5.3.1.4.

For information interchange there is no representation of end of day. It is recognized that the expression '24:00:00' is used as a natural language expression to denote end of a day; but for the benefit of clarity, '24' shall not be used to represent hour in accordance with this document.

### 5.3.3 UTC of day

Representations specified in 5.3.1.2 through 5.3.1.4 shall be used to express UTC of day, followed immediately, without space, by the UTC designator ["Z"]. The examples below are complete and reduced precision representations of the UTC of day 20 minutes and 30 seconds past 23 hours:

- |    |                  |                                 |           |           |
|----|------------------|---------------------------------|-----------|-----------|
| a) | Basic format:    | ["T"][hour][min][sec]["Z"]      | EXAMPLE 1 | T232030Z  |
|    |                  | ["T"][hour][min]["Z"]           | EXAMPLE 2 | T2320Z    |
|    |                  | ["T"][hour]["Z"]                | EXAMPLE 3 | T23Z      |
| b) | Extended format: | [hour][":"][min][":"][sec]["Z"] | EXAMPLE 4 | 23:20:30Z |
|    |                  | [hour][":"][min]["Z"]           | EXAMPLE 5 | 23:20Z    |
- (for hours-only expressions, extended format is not applicable)

### 5.3.4 Local time scale and UTC

#### 5.3.4.1 Time shift between local time scale and UTC

The time shift between the local time scale and UTC can be expressed in hours and minutes, or hours only. The minutes time scale component of the difference may be omitted only if the time shift between the time scales is an integral number of hours.

- |    |                  |          |           |        |
|----|------------------|----------|-----------|--------|
| a) | Basic format:    | [shift]  | EXAMPLE 1 | +0100  |
|    |                  | [shiftH] | EXAMPLE 2 | +01    |
| b) | Extended format: | [shiftX] | EXAMPLE 3 | +01:00 |
- (for hours-only expressions, extended format is not applicable)

#### 5.3.4.2 Local time of day with the time shift between local time scale and UTC

To express time of day along with the time shift between the local time scale and UTC, the time shift (expressed in hours-and-minutes, or hours-only) shall be appended, without space, to the local time of day.

The complete representation of the time of 27 minutes and 46 seconds past 15 hours locally in Geneva (in winter one hour ahead of UTC) and in New York (in winter five hours behind UTC), together with the indication of the time shift between the local time scale and UTC, are used as examples.

- |    |               |           |                              |
|----|---------------|-----------|------------------------------|
| a) | Basic format: |           |                              |
|    | [time][shift] | EXAMPLE 1 | T152746+0100<br>T152746-0500 |



[time][shiftH]	EXAMPLE 2	T152746+01
		T152746-05

b) Extended format:

[timeX][shiftX]	EXAMPLE 3	15:27:46+01:00
		15:27:46-05:00

[timeX][shiftH]	EXAMPLE 4	15:27:46+01
		15:27:46-05

Local time of day may be expressed with reduced precision as defined in [5.3.1.3](#), and a decimal fraction may be expressed as defined in [5.3.1.4](#).

### 5.3.5 Omissions of time designator

In time-only expressions, UTC of day expressions and time of day with time shift expressions, the time designator ["T"] may be omitted in the representations defined in [5.3](#) only when there is no risk of confusion.

EXAMPLE ["T"] is necessary for disambiguating the expressions '1920' and 'T1920'; as '1920' expresses a calendar year, 'T1920' expresses a time of day consisting of clock hours and clock minutes.

NOTE Due to expression distinction, the time designator ["T"] is not necessary in extended formats.

## 5.4 Date and time of day

### 5.4.1 General

A time can be expressed by combining a date expression — a calendar date ([5.2.2](#)), ordinal date ([5.2.3](#)) or week dates ([5.2.4](#)) — with a time of day expression.

The date is followed (without space) by ["T"] followed (without space) by the time, optionally including the time shift designator. The date part of a date and time expression shall be complete. The time may be incomplete (see [5.3.1.3](#)).

### 5.4.2 Complete representations

#### 5.4.2.1 Complete representations for calendar date and time of day

The following are complete representations of calendar dates:

a) Basic format:	[date]["T"][time]	EXAMPLE 1	19850412T232030
	[date]["T"][time]["Z"]	EXAMPLE 2	19850412T232030Z
	[date]["T"][time][shift]	EXAMPLE 3	19850412T232030+0400
	[date]["T"][time][shiftH]	EXAMPLE 4	19850412T232030+04
b) Extended format:	[dateX]["T"][timeX]	EXAMPLE 5	1985-04-12T23:20:30
	[dateX]["T"][timeX]["Z"]	EXAMPLE 6	1985-04-12T23:20:30Z
	[dateX]["T"][timeX][shiftX]	EXAMPLE 7	1985-04-12T23:20:30+04:00
	[dateX]["T"][timeX][shiftH]	EXAMPLE 8	1985-04-12T23:20:30+04



#### 5.4.2.2 Complete representations for ordinal date and time of day

The following are complete representations of ordinal dates:

a)	Basic format:	[odate][“T”][time]	EXAMPLE 1	1985102T232030
		[odate][“T”][time][“Z”]	EXAMPLE 2	1985102T232030Z
		[odate][“T”][time][shift]	EXAMPLE 3	1985102T232030+0400
		[odate][“T”][time][shiftH]	EXAMPLE 4	1985102T232030+04
b)	Extended format:	[odateX][“T”][timeX]	EXAMPLE 5	1985-102T23:20:30
		[odateX][“T”][timeX][“Z”]	EXAMPLE 6	1985-102T23:20:30Z
		[odateX][“T”][timeX][shiftX]	EXAMPLE 7	1985-102T23:20:30+04:00
		[odateX][“T”][timeX][shiftH]	EXAMPLE 8	1985-102T23:20:30+04

#### 5.4.2.3 Complete representations for week date and time of day

The following are complete representations of week dates:

a)	Basic format:	[wdate][“T”][time]	EXAMPLE 1	1985W155T232030
		[wdate][“T”][time][“Z”]	EXAMPLE 2	1985W155T232030Z
		[wdate][“T”][time][shift]	EXAMPLE 3	1985W155T232030+0400
		[wdate][“T”][time][shiftH]	EXAMPLE 4	1985W155T232030+04
b)	Extended format:	[wdateX][“T”][timeX]	EXAMPLE 5	1985-W15-5T23:20:30
		[wdateX][“T”][timeX][“Z”]	EXAMPLE 6	1985-W15-5T23:20:30Z
		[wdateX][“T”][timeX][shiftX]	EXAMPLE 7	1985-W15-5T23:20:30+04:00
		[wdateX][“T”][timeX][shiftH]	EXAMPLE 8	1985-W15-5T23:20:30+04

#### 5.4.3 Representations other than complete

A complete date expression (including expanded representations) followed by [“T”], may be followed by a reduced precision time of day expression — local time of day (5.3.1), UTC of day (5.3.3) or local time of day with time shift (5.3.4.2). The entire expression shall either be completely in basic format or completely in extended format.

The following are examples of combinations of date and reduced precision time of day expressions:

- a) Calendar date and local time of day
- |                  |                              |
|------------------|------------------------------|
| Basic format:    | [date][“T”][hour][min]       |
| EXAMPLE 1        | 19850412T1015                |
| Extended format: | [dateX][“T”][hour][“:”][min] |
| EXAMPLE 2        | 1985-04-12T10:15             |
- b) Ordinal date and UTC of day



Basic format: [date][“T”][hour][min][“Z”]

EXAMPLE 3 1985102T1015Z

Extended format: [dateX][“T”][hour][“:”][min][“Z”]

EXAMPLE 4 1985-102T10:15Z

- c) Week date and local time of day with the time shift between local time scale and UTC

Basic format: [wdate][“T”][hour][min][shift]

EXAMPLE 5 1985W155T1015+0400

Extended format: [wdateX][“T”][hour][“:”][min][shift]

EXAMPLE 6 1985-W15-5T10:15+04

## 5.5 Time interval

### 5.5.1 Means of specifying time intervals

A time interval shall be expressed in one of the following ways:

- a) by a start and an end;
- b) by a start and a duration;
- c) by a duration and an end.

NOTE By mutual agreement of the communicating partners, if the start or end of a time interval is supplied out of band, an expression of duration can be sufficient to express a time interval.

A solidus [“/”] shall be used as a separator to separate the two components specified in a), b) and c).

For expression of a time interval by a start and an end, higher order time scale components may be omitted from the “end of time interval”, provided that the resulting expression is unambiguous. In this case the omitted higher order components from the “start of time interval” expression apply.

EXAMPLE 1 ‘2018-01-15/02-20’ represents ‘2018-01-15/2018-02-20’ as the expression ‘02-08’ is unambiguously the last two time components, i.e. a calendar month and a calendar day.

Representations for time zones and UTC included with the component preceding the separator shall be assumed to apply to the component following the separator, unless a corresponding alternative is included.

EXAMPLE 2 ‘2018-01-15+05:00/2018-02-20’ is equivalent to ‘2018-01-15+05:00/2018-02-20+05:00’ as the ‘+05:00’ time shift also applies to the expression after the separator.

### 5.5.2 Duration

#### 5.5.2.1 General

Duration can be expressed by a combination of units — years, months, weeks, days, hours, minutes and seconds — with designators. A duration expression shall begin with [“P”].

#### 5.5.2.2 Complete representation

The complete representation of the expression for duration shall be one of:

- a) [“P”][i][“Y”][i][“M”][i][“D”][i][“T”][i][“H”][i][“M”][i][“S”];



- b) ["P"][i]["W"].

### 5.5.2.3 Representations other than complete

For representations other than complete, the following rules apply.

- a) If the number of years, months, days, hours, minutes or seconds in the representation of [5.5.2.2 a\)](#) equals zero, the number and the corresponding designator may be absent; however, at least one number and its designator shall be present.
- b) The lowest order component may have a decimal fraction. The decimal fraction shall be divided from the integer part by the decimal sign. It shall have one or more digits; if the magnitude of the number is less than one, the decimal sign shall be preceded by a zero (see [ISO 80000-1](#)).
- c) The usage of the time designator ["T"] is as specified in [5.3.5](#).

### 5.5.2.4 Alternative format

By mutual agreement of the communicating partners, duration may be expressed in conformity with the complete representations used for date (as specified in [5.2.2.1](#), [5.2.3.1](#)) and time (as specified in [5.3.1.2](#)).

The representation of duration in the alternative format is as follows:

- a) Basic format:

["P"][date]["T"][time]	EXAMPLE 1	P00020110T223355
["P"][odate]["T"][time]	EXAMPLE 2	P0002178T223355

- b) Extended format:

["P"][dateX]["T"][timeX]	EXAMPLE 3	P0002-01-10T22:33:55
["P"][odateX]["T"][timeX]	EXAMPLE 4	P0002-178T22:33:55

NOTE The above examples are equivalent to and are alternative formats for the expression 'P2Y1M10DT22H33M55S'.

## 5.5.3 Complete representations

### 5.5.3.1 Representations of time intervals identified by start and end

A complete representation of a time interval, identified by its start and its end, combines two complete date and time of day representations (as defined in [5.4.2](#)), provided that the resulting expression is either consistently in basic format or consistently in extended format.

- a) Basic format:  
[date]["T"][time]["/"][date]["T"][time]  
EXAMPLE 1 19850412T232050/19850625T103000
- b) Extended format:  
[dateX]["T"][timeX]["/"][dateX]["T"][timeX]  
EXAMPLE 2 1985-04-12T23:20:50/1985-06-25T10:30:00

NOTE The above examples represent a time interval beginning at 20 minutes and 50 seconds past 23 hours on 12 April 1985 local time of day and ending at 30 minutes past 10 hours on 25 June 1985 local time of day.



### 5.5.3.2 Representations of time interval identified by start and duration

A complete representation of a time interval, identified by its start and its duration, combines a complete date and time of day representation (5.4.2) with a complete representation of duration (5.5.2).

- a) Basic format: [date][“T”][time][“/”][duration]  
EXAMPLE 1 19850412T232050/P1Y2M15DT12H30M0S
- b) Extended format: [dateX][“T”][timeX][“/”][duration]  
EXAMPLE 2 1985-04-12T23:20:50/P1Y2M15DT12H30M0S

NOTE The above examples represent a time interval of 1 year, 2 months, 15 days, 12 hours and 30 minutes, beginning on 12 April 1985 at 20 minutes and 50 seconds past 23 hours local time of day.

### 5.5.3.3 Representations of time interval identified by duration and end

A complete representation of a time interval, identified by its duration and its end, combines a complete representation of the duration (5.5.2) with a complete representation of date and time of day (5.4.2).

- a) Basic format: [duration][“/”][date][“T”][time]  
EXAMPLE 1 P1Y2M15DT12H30M0S/19850412T232050
- b) Extended format: [duration][“/”][dateX][“T”][timeX]  
EXAMPLE 2 P1Y2M15DT12H30M0S/1985-04-12T23:20:50

NOTE The above examples represent a time interval of 1 year, 2 months, 15 days, 12 hours and 30 minutes, ending on 12 April 1985 at 20 minutes and 50 seconds past 23 hours local time of day.

### 5.5.3.4 Other complete representations

In 5.5.3.1 through 5.5.3.3 representations are shown using calendar date, local time of day and duration units. Other complete representations are found by making the following substitutions in each of 5.5.3.1 through 5.5.3.3:

- a) where representations include calendar dates (see 5.2.2.1), a complete representation of ordinal dates (see 5.2.3.1) or of week dates (see 5.2.4.1) may be substituted;
- b) where representations include a local time of day component (see 5.3.1), a time shift (see 4.3.13) may be appended.

### 5.5.4 Representations other than complete

A representation of a time interval, where the representation of the start, end or duration is other than complete, shall be considered a representation other than complete of the time interval.

## 5.6 Recurring time interval

### 5.6.1 Means of specifying recurring time intervals

A recurring time interval shall be expressed in one of the following ways.

- a) by a number of recurrences (optional), followed by a start and an end which identify the first time interval;
- b) by a number of recurrences (optional), followed by a start and a duration which identify the first time interval;



- c) by a number of recurrences (optional), followed by a duration and an end which identify the last time interval.

In all cases, if the number of recurrences is absent, the number of occurrences is unbounded.

NOTE 1 In some applications, a recurring time interval is expressed by a number of recurrences (optional) and duration alone, because either the start or end is supplied out-of-band.

NOTE 2 [ISO 8601-2:2019](#), Clause 5 extends this clause by adding a rule to define the repeat pattern.

### 5.6.2 Separators and designators

A recurring time interval is expressed according to the following rule.

All representations shall

- start with the recurring time interval designator ["R"];
- be followed, without spaces, by the number of recurrences, if present, represented below as [n] (which may be omitted, in which case the number of recurrences is unbounded);
- be followed, without spaces, by a solidus ["/"];
- be followed, without spaces, by the expression of a time interval as per [5.5.1](#).

### 5.6.3 Complete representations

A complete representation of a recurring time interval is as follows:

- a) Basic format:

["R"][n]["/"][date]["T"][time]["/"][date]["T"][time]

EXAMPLE 1 R12/19850412T232050/19850625T103000

["R"][n]["/"][date]["T"][time]["/"][duration]

EXAMPLE 2 R12/19850412T232050/P1Y2M15DT12H30M0S

["R"][n]["/"][duration]["/"][date]["T"][time]

EXAMPLE 3 R12/P1Y2M15DT12H30M0S/19850412T232050

- b) Extended format:

["R"][n]["/"][dateX]["T"][timeX]["/"][dateX]["T"][timeX]

EXAMPLE 4 R12/1985-04-12T23:20:50/1985-06-25T10:30:00

["R"][n]["/"][dateX]["T"][timeX]["/"][duration]

EXAMPLE 5 R12/1985-04-12T23:20:50/P1Y2M15DT12H30M0S

["R"][n]["/"][duration]["/"][dateX]["T"][timeX]

EXAMPLE 6 R12/P1Y2M15DT12H30M0S/1985-04-12T23:20:50

### 5.6.4 Representations other than complete

A representation of a recurring time interval, where the representation of the time interval is other than complete, shall be considered a representation other than complete of the recurring time interval.



## Annex A (informative)

### Example date and time expressions and representations

#### A.1 Date and time expressions

##### A.1.1 Date

**Table A.1 — Calendar date — 12 April 1985**

Basic format	Extended format	Explanation
19850412	1985-04-12	Complete

**Table A.2 — Ordinal date — 12 April 1985**

Basic format	Extended format	Explanation
1985102	1985-102	Complete

**Table A.3 — Week date — Friday 12 April 1985**

Basic format	Extended format	Explanation
1985W155	1985-W15-5	Complete

**Table A.4 — Calendar week — 15th week of 1985**

Basic format	Extended format	Explanation
1985W15	1985-W15	Reduced precision

**Table A.5 — Calendar month — April 1985**

Basic format	Extended format	Explanation
1985-04	Not applicable	Reduced precision

**Table A.6 — Calendar year — 1985**

Basic format	Extended format	Explanation
1985	Not applicable	Reduced precision

**Table A.7 — Calendar date — Expanded; six digits to represent the year — 12 April 16808**

Basic format	Extended format	Explanation
+0168080412	+016808-04-12	Complete

**Table A.8 — Calendar date — Negative date — 12 April in the second year before the year [0000]**

Basic format	Extended format	Explanation
-00020412	-0002-04-12	Complete

##### A.1.2 Time of day



**Table A.9 — Local time of day — 27 minutes and 46 seconds past 15 hours**

Basic format	Extended format	Explanation
152746	15:27:46	Complete
1528	15:28	Reduced precision with only hour and minute
15	Not applicable	Reduced precision with only hour

**Table A.10 — Local time of day with decimal fractions — 27 minutes and 35 and a half second past 15 hours**

Basic format	Extended format	Explanation
152735,5	15:27:35,5	Complete, fraction with decimal

**Table A.11 — Beginning of day**

Basic format	Extended format	Explanation
000000	00:00:00	Complete
0000	00:00	Hour and minute only

**Table A.12 — UTC of day — 20 minutes and 30 seconds past 23 hours**

Basic format	Extended format	Explanation
232030Z	23:20:30Z	Complete
2320Z	23:20Z	Reduced precision with only hour and minute
23Z	Not applicable	Reduced precision with only hour

**Table A.13 — Time shift between local time scale and UTC — One hour ahead of UTC**

Basic format	Extended format	Explanation
+0100	+01:00	Complete
+01	+01	Time shift expressed in hours only

**Table A.14 — Time shift between local time scale and UTC — Five hours behind UTC**

Basic format	Extended format	Explanation
-0500	-05:00	Complete
-05	-05	Time shift expressed in hours only

**Table A.15 — Local time of day with the time shift between local time scale and UTC — 27 minutes 46 seconds past 15 hours locally in Geneva (one hour ahead of UTC)**

Basic format	Extended format	Explanation
152746+0100	15:27:46+01:00	Complete
152746+01	15:27:46+01	Time shift expressed in hours only



**Table A.16 — Local time of day with the time shift between local time scale and UTC — 27 minutes 46 seconds past 15 hours locally in New York (five hours behind UTC)**

Basic format	Extended format	Explanation
152746-0500	15:27:46-05:00	Complete
152746-05	15:27:46-05	Time shift expressed in hours only

**A.1.3 Date and time of day****Table A.17 — Combinations of calendar date and local time of day**

Basic format	Extended format	Explanation
19850412T101530	1985-04-12T10:15:30	Complete

**Table A.18 — Combinations of ordinal date and UTC of day**

Basic format	Extended format	Explanation
1985102T235030Z	1985-102T23:50:30Z	Complete

**Table A.19 — Combinations of week date and local time of day**

Basic format	Extended format	Explanation
1985W155T235030	1985-W15-5T23:50:30	Complete

**A.1.4 Time interval****A.1.4.1 Defined by start and end**

[Table A.20](#) shows the basic and extended format of a time interval starting at 20 minutes and 50 seconds past 23 hours on 12 April 1985 and ending at 30 minutes past 10 hours on 25 June 1985.

**Table A.20 — Time interval defined by start and end — Example 1**

Basic format	Extended format
19850412T232050/19850625T103000	1985-04-12T23:20:50/1985-06-25T10:30:00

[Table A.21](#) shows the basic and extended format of a time interval starting on 12 April 1985 and ending on 25 June 1985.

**Table A.21 — Time interval defined by start and end — Example 2**

Basic format	Extended format
19850412/19850625	1985-04-12/1985-06-25

**A.1.4.2 Defined by start and duration**

[Table A.22](#) shows the basic and extended format of a time interval of 1 year, 2 months, 15 days and 12 hours, beginning on 12 April 1985 at 20 minutes past 23 hours.

**Table A.22 — Time interval defined by start and duration — Example**

Basic format	Extended format
19850412T232000/P1Y2M15DT12H	1985-04-12T23:20:00/P1Y2M15DT12H



### A.1.4.3 Defined by duration and end

[Table A.23](#) shows the basic and extended format of a time interval of 1 year, 2 months, 15 days and 12 hours, ending on 12 April 1985 at 20 minutes past 23 hours.

**Table A.23 — Time interval defined by duration and end — Example**

Basic format	Extended format
P1Y2M15DT12H/19850412T232000	P1Y2M15DT12H/1985-04-12T23:20:00

### A.1.5 Recurring time interval

#### A.1.5.1 Defined by recurrences, start and end

[Table A.24](#) shows the basic and extended format of fifteen recurrences of a time interval where the first occurrence starts at 20 minutes and 50 seconds past 23 hours on 12 April 1985 and ends at 30 minutes past 10 hours on 25 June 1985.

**Table A.24 — Recurring time interval defined by recurrences, start and end — Example 1**

Basic format	Extended format
R15/19850412T232050/19850625T103000	R15/1985-04-12T23:20:50/1985-06-25T10:30:00

[Table A.25](#) shows the basic and extended format of an unbounded number of recurrences of a time interval where the first occurrence starts at 20 minutes and 50 seconds past 23 hours on 12 April 1985 and the first occurrence ends at 30 minutes past 10 hours on 25 June 1985.

**Table A.25 — Recurring time interval defined by recurrences, start and end — Example 2**

Basic format	Extended format
R/19850412T232050/19850625T103000	R/1985-04-12T23:20:50/1985-06-25T10:30:00

#### A.1.5.2 Defined by recurrences, start and duration

[Table A.26](#) shows the basic and extended format of two recurrences of a time interval of 1 year and 6 months where the first occurrence starts at 20 minutes and 50 seconds past 23 hours on 12 April 1985 and ends 1 year and 6 months later.

**Table A.26 — Recurring time interval defined by recurrences, start and duration — Example 1**

Basic format	Extended format
R2/19850412T232050/P1Y6M	R2/1985-04-12T23:20:50/P1Y6M
R2/19850412T232050/P0001-06	R2/1985-04-12T23:20:50/P0001-06

[Table A.27](#) shows the basic and extended format of eight recurrences of a time interval of 72 hours where the first occurrence starts at 20 minutes and 50 seconds past 23 hours on 12 April 1985 and ends 72 hours later.

**Table A.27 — Recurring time interval defined by recurrences, start and duration — Example 2**

Basic format	Extended format
R8/19850412T232050/PT72H	R8/1985-04-12T23:20:50/PT72H



**A.1.5.3 Defined by recurrences, duration and end**

Table A.28 shows the basic and extended format of an unbounded number of occurrences of a time interval of 1 year, 2 months, 15 days and 12 hours of which the last occurrence ends at 12 April 1985 at 20 minutes and 50 seconds past 23 hours.

**Table A.28 — Recurring time interval defined by recurrences, duration and end — Example**

Basic format	Extended format
R/P1Y2M15DT12H/19850412T232050	R/P1Y2M15DT12H/1985-04-12T23:20:50

**A.2 Date and time representations****A.2.1 Date****Table A.29 — Representations for calendar date**

Basic format	Extended format	Explanation
YYYYMMDD	YYYY-MM-DD	Complete calendar date
±YYYYYYDDD	±YYYYYY-DDD	Expanded ordinal date with two digits added
YYYY"W"WW	YYYY-"W"WW	Week date with precision reduced to week

**A.2.2 Time of day****Table A.30 — Representations for time of day**

Basic format	Extended format	Explanation
hhmmss	hh:"mm":ss	Complete local time of day
hhmm,"m"Z	hh:"mm","m"Z	Reduced precision UTC of day with one-digit decimal fraction for minutes
hhmm±hhmm	hh:"mm±hh:"mm	Local time of day with the time shift between local time scale and UTC — reduced precision omitting seconds in the local time of day

**A.2.3 Date and time of day****Table A.31 — Representations for the combination of date and time of day**

Basic format	Extended format	Explanation
YYYYDDD"T"hhmm	YYYY-DDD"T"hh:"mm	Complete ordinal date — reduced precision time of day
YYYYMMDDhhmm,m	YYYY-MM-DDhh:"mm","m	Complete calendar date — reduced precision time of day with one-digit decimal fraction for minute — time designator omitted
YYYY"W"WWD"T"hh","hh"Z	YYYY-"W"WW-"D"T"hh","hh"Z	Complete week date — reduced precision UTC of day with two-digit decimal fraction for the hour

**A.2.4 Time interval**



**Table A.32 — Time interval by start and end — complete calendar date — reduced precision  
UTC of day with one-digit decimal fraction**

Basic format	Extended format
YYYYMMDD"T"hhmm","m"Z/"YYYYMMDD"T"hhmm","m	YYYY"-MM"-DD"T"hh:"mm","m"Z/"YYYY"-MM"-DD"T"hh:"mm","m

## A.2.5 Recurring time interval

**Table A.33 — Time interval by number of recurrences, start and end — recurrence specified through a positive integer (or left absent to signify an unbounded number) — start and end by week date with reduced precision**

Basic format	Extended format
"R"n"/"YYYY"W"WW"/"YYYY"W"WW	"R"n"/"YYYY"-W"WW"/"YYYY"-W"WW

**Table A.34 — Time interval by number of recurrences, begin and duration — recurrence specified through a positive integer (or left absent to signify an unbounded number) — start by complete ordinal date — duration by a number of days, where the number is a positive integer**

Basic format	Extended format
"R"n"/"YYYYDDD"/P"i"D"	"R"n"/"YYYY-DDD"/P"i"D"



## Bibliography

- [1] [ISO/IEC 646](#), *Information technology — ISO 7-bit coded character set for information interchange*
- [2] [ISO 8601-2:2019](#), *Date and time — Representations for information interchange — Part 2: Extensions*
- [3] [ISO 80000-1](#)<sup>1)</sup>, *Quantities and units — Part 1: General*
- [4] [ISO 80000-3](#)<sup>2)</sup>, *Quantities and units — Part 3: Space and time*
- [5] [IEC 60050-113:2011](#), *International Electrotechnical Vocabulary — Part 113: Physics for electrotechnology*
- [6] IEC 60050-713:1998, *International Electrotechnical Vocabulary — Part 713: Radiocommunications: transmitters, receivers, networks and operation*
- [7] ITU-R TF.460-6, *Standard-frequency and time-signal emissions*
- [8] BIPM Recommendation CCTF 3 (2017), Bureau International des Poids et Mesures / The International Bureau of Weights and Measures: Consultative Committee for Time and Frequency (CCTF), *Report of the 21st meeting to the International Committee for Weights and Measures*, 2017
- [9] International Astronomical Union Resolution B1.9 (2000), International Astronomical Union, *IAU Resolutions adopted at the 24th General Assembly*, 2000

---

1) Under preparation. Stage at the time of publication: ISO/DIS 80000-1:2019.

2) Under preparation. Stage at the time of publication: ISO/FDIS 80000-3:2019.



# British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

## About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

## Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at [bsigroup.com/standards](https://bsigroup.com/standards) or contacting our Customer Services team or Knowledge Centre.

## Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at [bsigroup.com/shop](https://bsigroup.com/shop), where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

## Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

## Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.
- Standards purchased in hard copy format:
- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

## Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing team.

## Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to [bsigroup.com/subscriptions](https://bsigroup.com/subscriptions).

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

**PLUS** is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit [bsigroup.com/shop](https://bsigroup.com/shop).

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email [subscriptions@bsigroup.com](mailto:subscriptions@bsigroup.com).

## Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

## Useful Contacts

### Customer Services

**Tel:** +44 345 086 9001

**Email (orders):** [orders@bsigroup.com](mailto:orders@bsigroup.com)

**Email (enquiries):** [cservices@bsigroup.com](mailto:cservices@bsigroup.com)

### Subscriptions

**Tel:** +44 345 086 9001

**Email:** [subscriptions@bsigroup.com](mailto:subscriptions@bsigroup.com)

### Knowledge Centre

**Tel:** +44 20 8996 7004

**Email:** [knowledgecentre@bsigroup.com](mailto:knowledgecentre@bsigroup.com)

### Copyright & Licensing

**Tel:** +44 20 8996 7070

**Email:** [copyright@bsigroup.com](mailto:copyright@bsigroup.com)

## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK